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No. XIX.

Description of a New Genus and New Species of Extinct Mammiferous Quadruped. By John D. Godman, M.D.

THE subject of the following description was disinterred a short time since by Mr Archibald Crawford, about twelve miles from Newburg, in Orange county, New York; a region deservedly celebrated for its inestimable contribution to natural history in the splendid skeleton of the gigantic Mastodon, which was thence obtained in 1801 by the indefatigable founder of the Philadelphia Museum.

The bones obtained by Mr Crawford are in a good state of preservation, and comprise the following parts of the skeleton:—

The anterior part of the head; consisting of parts of the frontal, intermaxillary, superior maxillary and two-thirds of the lower jaw bones; the tusks and sixteen teeth. Of the posterior part of the head there is but a small fragment, being a piece of the occipital bone, distinguished by the presence of nearly one condyle, and showing a small part of the circle of the foramen magnum.

Of the bones of the trunk and extremities, there are four vertebrae, and one separate spinous process; two ribs, of which one is whole and the other broken and imperfect; a humerus, radius, ulna, and two digital phalanges; a femur, tibia, and five epiphyses or heads of bones, separated from their shafts, which, with other circumstances, show that the animal had not attained its adult age.

The right side of the head is the most perfect, and when the bones are placed in apposition, give a good idea of the general character of this part of the skull, which strongly reminds us of that of an Elephant. [See Plate XVII. Fig. 1.] A line drawn from the highest part of the frontal to the extremity of the intermaxillary bone measures seventeen inches. [Fig. 2.] The fragment of the frontal bone makes up about five inches of this extent, and is united to the superior edge of the maxillary bone by a suture, and forms at its junction therewith the superior anterior border of the orbit of the eye; the posterior part of the frontal is broken and lost.

Of the right upper maxillary bone, the whole is preserved, from the end of its alveolus for the tusk, anteriorly, to as far back as the posterior margin of the second molar or permanent tooth. A line drawn perpendicular to this tooth would mark its extent superiorly where it forms the inferior anterior part of the orbit, of which about one half remains. All posterior to the line mentioned is lost, the bone being broken through its malar process, which still presents a projection about an inch long. The foramen infra-orbitarium is situated at the anterior extremity of the base of this process, and in a line with the inner angle of the orbit. The superior maxillary bone, measured from its highest part united to the *os frontis*, to the edge of the alveole containing the posterior tooth, is eleven inches high. Inferiorly and internally it is quite imperfect, consisting of only as much of the alveolar process as serves to contain three teeth, a small part of the palatine process, and the inferior part of the socket for the tusk; this part of the socket projects two inches or more beyond the anterior teeth.

The intermaxillary bones are of considerable size; that of the right side being rather more than twelve inches long and three broad, extending from the inferior edge of the frontal bone to the base of the great tusk, the superior part of whose sockets it forms. The entrance to the nasal passage is designated by a semicircular indentation on the internal edge of this bone, which is uninjured at this part; lower down a

small piece is fractured from its inner edge. The intermaxillary of the left side is destroyed, except at its inferior part, forming the superior portion of the alveole for the tusk.

The tusks belonging to this jaw are in a tolerable good state of preservation, though not wholly uninjured. The entire length of the right tusk is seventeen inches, five of which are within the socket. The tusks, where they emerge from the socket, are four inches and three-eighths apart, and at this point they are seven inches and a half in circumference. They do not perceptibly decrease until within about four inches of the extremity, whence they taper to the point; this is worn in a peculiar manner on its inferior and external surfaces, as may be better understood by the excellent accompanying drawings from the masterly pencil of my estimable friend Mr Titian R. Peale, whose skill and judgment as a naturalist are so admirably displayed by his numerous contributions to the Philadelphia Museum.

Of the lower jaw [Plate XVIII. Fig. 1.] about two-thirds, in a good state of preservation, have been obtained; with the exception of part of the condyloid, the whole of the coronoid, and a small part of the posterior alveolar processes, the right ramus of the jaw is complete, and its inferior and lateral outline from the angle to the apex is uninjured. Superiorly the coronoid process, as just stated, is destroyed as far as the posterior margin of the second molar tooth; but thence anteriorly the jaw is also perfect. Twelve inches of the left ramus are preserved, the condyloid, coronoid, and part of the alveolar processes being broken off, a little posterior to the first permanent tooth. The mental foramen for the exit of the labial branch of the lower maxillary nerve is situated on a line with the root of the second deciduous tooth. Between two and three inches in front of this foramen, which is half an inch in diameter, there are three others of smaller size for the passage of vessels, nerves, &c. to the lip and parts adjacent to the insertion of the inferior tusks.

The great peculiarity of this jaw, and that which separates this animal from every genus hitherto established, is its elon-

gated or rostrated extremity, containing the alveolar processes or sockets for two very remarkable tusks. The superior border of the jaw, from the situation of the anterior teeth, declines immediately, tapering towards the level of these sockets. Inferiorly the outline of the jaw does not so immediately change, until opposite the anterior mental foramina, whence it suddenly diminishes to the end. The rostrated portion of the jaw, anterior to the front teeth, is three inches and three-fourths long, and superiorly is regularly hollowed or grooved as for the reception of the tongue; this hollow is two inches wide, quite smooth, and bounded on each side by thin raised edges.

The alveolar processes for the tusks are contained within the rostrated part of this jaw, and are nearly an inch in diameter at their outlet; the right one being three, and the left two inches in depth, gradually diverging from the centre, and decreasing in width as they penetrate the bone. The tusks belonging to these sockets are of a very striking appearance, and that of the right side, which is entire and well preserved, is four inches in length, three inches of which are within the socket. The projecting external part is covered by a shining, hard, black enamel, and is smooth and round at its point; the other part appears to be a dark, grayish, bony matter, dry on the surface, yielding to the pressure of the nail. The part of this tusk within the socket is exactly accommodated thereto, tapering to a small point. The external projecting part has a peculiar spiral twist for about an inch and a half from its anterior extremity, as will be readily understood by referring to the plate. [Plate XVIII. Fig. 2.]

In relation to the dentition of the animal, we find it possessed of sixteen teeth, eight of which (the two anterior teeth on each side of both jaws) are deciduous or milk teeth; on the right side one of these has fallen out, while all the remaining deciduous teeth are considerably worn, so as to show that the enamel merely covers the external surface of their crowns, as in the Mastodon, and does not penetrate their substance as in the Elephant, &c. The permanent

teeth, which are four in number in each jaw, are acutely mammillated, forming three transverse ranges of wedge-shaped tubercles. The first is three inches in length; the second or last tooth three and a half; the deciduous teeth are much smaller, the first measuring but half an inch, the second two inches. The roots of all the teeth are short, as the greatest depth of the lower jaw is but four inches.

Of the other bones the vertebræ are about an inch and a half long, and three inches in diameter; the separate spinous process is seven and a half inches; the entire rib is twenty inches long, and its curvature four inches; the greatest diameter of the broken rib is an inch and a half. The humerus is seventeen inches long, and three in diameter; radius thirteen inches in length, one and a half in diameter; the ulna fourteen inches long, two and a half in diameter. The digital phalanx is three inches long, and three in diameter; the tibia is fourteen and a half inches long, and three in diameter.

While engaged in the examination of the New York specimen, my friend, Mr Franklin Peale, manager of the Philadelphia Museum, informed me that he had seen a jaw bone in the cabinet of the University of Virginia which must have belonged to the same species. In consequence I immediately addressed a note to the Professor of Anatomy in that institution, R. Dunglison, M.D. requesting an accurate description of this bone. This gentleman, who is equally distinguished for zealous devotion to the cause of science and polished urbanity of manners, favoured me with an immediate and satisfactory answer, from which the following particulars are derived.

In the collection examined by Professor Dunglison there are two parts of lower jaws, most probably belonging to the same species, though to individuals of different ages. These have been clumsily joined, as if they had formed a single jaw. The right side of the jaw is complete from the angle to the apex of the chin, which is perfect, having about three inches of the left side preserved. The lower jaw is

elongated at its anterior part, and hollowed out superiorly, while on each side of the symphysis menti there is a canal extending obliquely upwards through the bone, the right one contains the root of a tusk, which occupies the whole socket, and projects slightly on the inner side, being 1.25 in diameter. This right portion of the lower jaw is two feet four inches long, measured along its base, and weighs forty pounds*.

Every view taken of this animal strongly reminds us of its resemblance to the gigantic Mastodon; and but for the singular difference of organization presented by the lower jaw and its tusks, we could not avoid concluding we had obtained a young animal of that species. We have made diligent examination of the different perfect lower jaws of the Mastodon preserved in the cabinets of the Philadelphia and Baltimore Museums, the cabinet of the New York Lyceum, &c. to discover whether any trace of this structure could be found, or had possibly been overlooked by previous observers.

These researches ended in a conviction that nothing like this construction pertained to the Mastodon, whose lower jaw ends in a distinctly decurved extremity, simply suited to give attachment to the muscles of a lip; as is evident on referring to a specimen or to any authentic engraving. We are therefore under the necessity of regarding it as a *new*, but closely allied *genus* to the Mastodon; and propose for it the following name and characters:—

* The lower jaw bone of the Mastodon is two feet ten inches long, and weighs sixty pounds; hence our animal, in the adult state, was of about the same size.

ORDER BELLUÆ L. (PACHYDERMATA, C.)

FAMILY PROBOSCIDIA.

Genus Tetracaulodon. (GODMAN.)*

Dental Formula: Incisive $\frac{2}{2}$, Canine $\frac{8}{8}$, Molar $\frac{22}{22} = 12$.

Character: having four tusks; of which two, large and strong, similar to those of the Mastodon, belong to the upper jaw, and two, small, short and spiral, project from sockets on each side of the chin. The lower jaw produced or elongated at the symphysis; having on its superior surface a smooth hollow groove for the tongue, and terminating in a narrow apex containing sockets for the inferior tusks.

Species 1. T. Mastodontoides. GODM.

In addition to the preceding details, the species will be sufficiently characterized by observing, that in the lower jaw of the adult its outlines are peculiarly straight or rectangular, exhibiting none of those bold curvatures and projections so conspicuous in the allied genus Mastodon, about the angles and base of the jaw. The condyloid process is thrown farther backward, and the coronoid process is not separated from it by a deep semilunar notch, as in the other genus, the bone gently ascending from the tip of the coronoid until it terminates in the condyle. These peculiarities clearly indicate a very marked difference in the arrangement and power of the muscular apparatus, as well as suggest thoughts of differences in mode of life and regimen, between the two genera during their existence.

Of this highly interesting species, we are now aware of the preservation of fragments of *three* well authenticated individuals. Two adult jaw bones (one of which is nearly two-thirds entire) in the Museum of the University of Virginia; the young specimen, the immediate subject of this descrip-

* From τετράς, four; and χαυλιόδοντα, tusks.

tion, belonging to the beautiful Museum of R. Peale of New York; of a fourth we have heard, as being in possession of a distinguished scientific gentleman of that city, though of this we can affirm nothing positively. It is highly probable that other specimens have been raised by those engaged in canalling, &c. that have been laid aside as Mastodon bones, which they so closely resemble.*

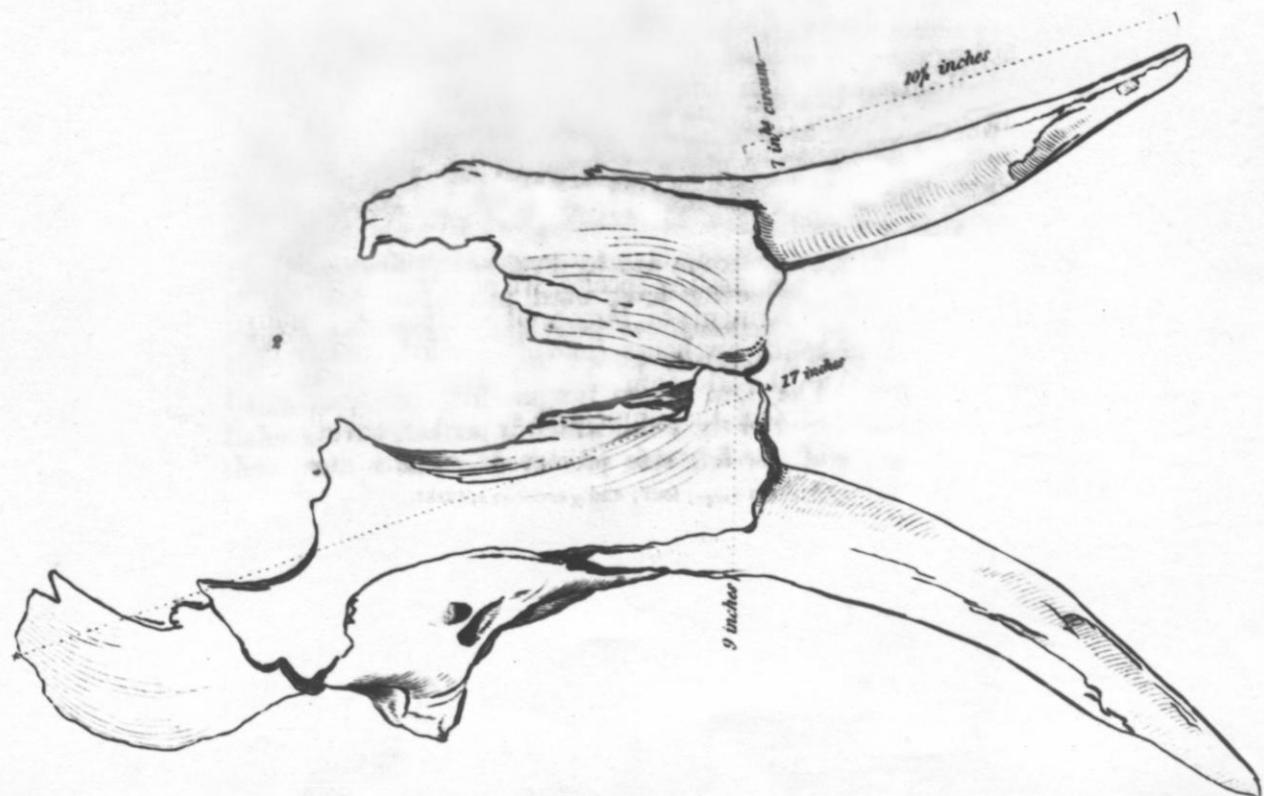
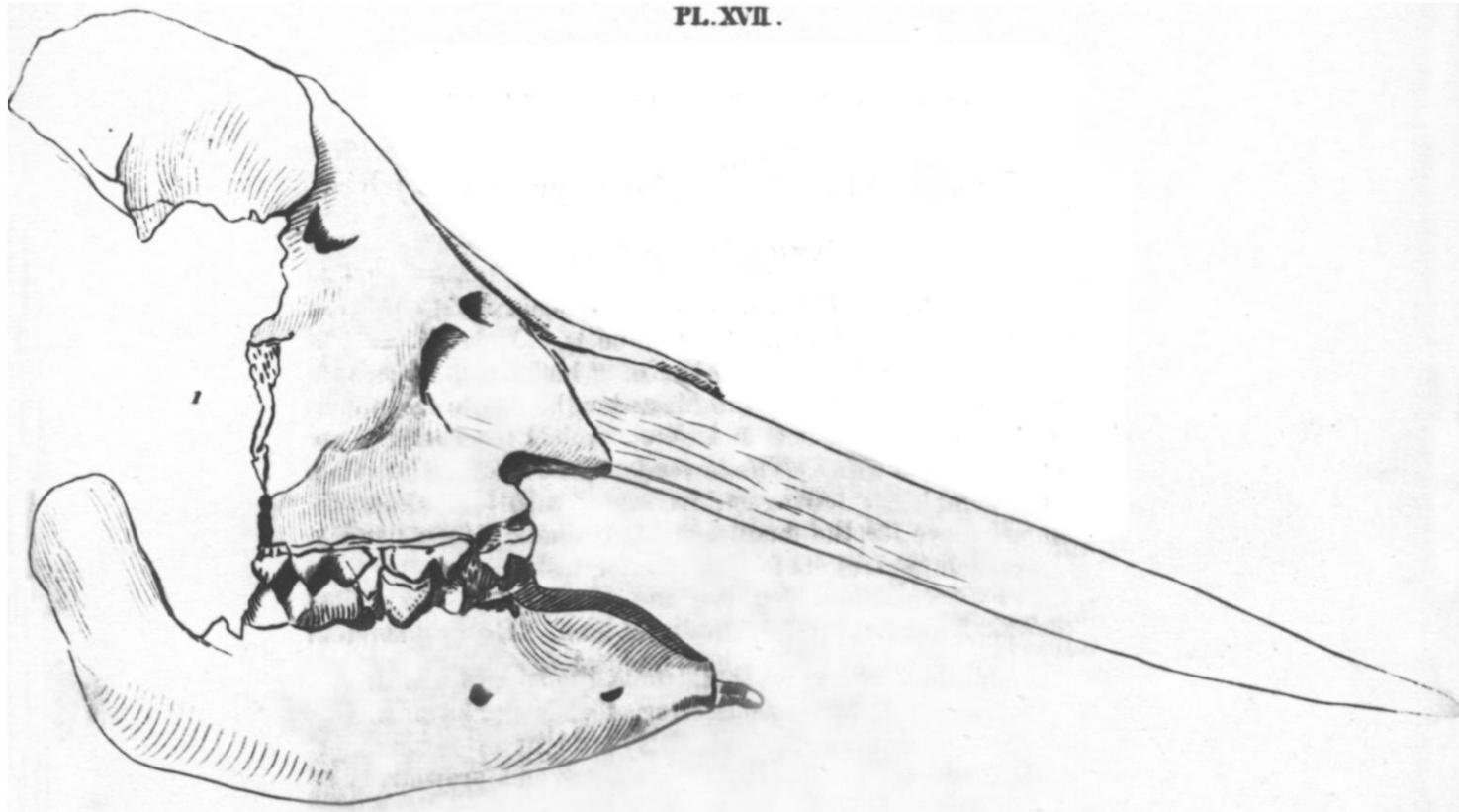
In regard to the relative position of the animal in the class Mammalia, we are led by the form of the lower jaw and tusks to believe that it should stand between the genera Mastodon and Hippopotamus; being allied to the former by the general character of the teeth and skeleton, and to the latter especially, by the inferior tusks, as well as the form of the molar teeth. The same circumstances would cause us to conclude that the regimen of our animal might have been of a mixed character, or that like the Hippopotamus this genus was somewhat aquatic and fed upon the productions found in rivers, lakes, or marshes. However this may be decided, the proofs of the former existence of the genus are unequivocal, and will no doubt be multiplied if proper attention be paid to the explorations making throughout our own country.

In concluding this paper the writer would feel culpable of neglect did he not return his warmest thanks to the intelligent discoverer of these bones for the opportunity afforded of examining and describing them, as well as to his friends Dr Boyd of New York, and Messrs Rubens and Titian R. Peale for their much valued assistance.

[*READ, Friday, January 1st, 1830.*]

* Since this paper was in type we have learned with much pleasure that a second exploration made by Mr Crawford has been very productive, and there is reason to hope that Mr Rubens Peale will be enabled thereby to mount an entire skeleton of the *Tetracaulodon Mastodontoideum*.

PL. XVII.



PL. XVIII.

